UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/752,534	12/29/2000	Manoj Khare	42390P9878	1416

7590   10/01/2003

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EXAMINER
PATEL, HETUL B

ART UNIT	PAPER NUMBER
2186	

DATE MAILED: 10/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>03</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>29 December 2000</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-26</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-26</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>19 November 2002</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a)☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4)☐ Interview Summary (PTO-413) Paper No(s). _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____ .

DETAILED ACTION

Specification

1.   Claims 1-26 are presented for examinations.

Claim Objections

2.   Claims 5, 13 and 23 are objected to because of the following informalities:

These claims should read "...receiving <u>modified contents</u> of the cache

line" instead of "...receiving <u>a modified contents</u> of the cache line".

Appropriate correction is required.

Oath/Declaration

3.   The oath or declaration is defective. A new oath or declaration in

compliance with 37 CFR 1.67(a) identifying this application by application

number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

Non-initialed and/or non-dated alterations have been made to the oath or
declaration. See 37 CFR 1.52(c).

On the main title page of this application, the following four inventor's
names are listed: Manoj Khare, Lily P. Looi, Akhilesh Kuar <u>and Kenneth C. Creta</u>.
In the oath and declaration page, the following four inventor's names are listed:
Manoj Khare, Lily P. Looi, Akhilesh Kuar <u>and Faye A. Briggs</u>. Date and initials of
Kenneth C. Creta and/or Faye A. Briggs are missing.

Appropriate correction(s) is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described
> as set forth in section 102 of this title, if the differences between the subject matter sought to
> be patented and the prior art are such that the subject matter as a whole would have been

obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson et al. (USPN: 6,598,123), hereinafter, Anderson, in view of Witt (USPN: 5,623,627).

As per claims 1-6, Anderson discloses a method that comprises,

- maintaining a state by maintaining a presence vector, which indicates whether

  o the first node has a copy of a contents corresponding to the cache line (e.g. see column 3, lines 45-47); and

  o the state is a shared state or an exclusive state (e.g. see column 3, lines 47-51).

However, Anderson does not disclose that his method comprising, in response to a request from a second node to access the cache line, determining whether the state is an ambiguous state; and resolving the ambiguous state. Witt, on the other hand, in his teaching of computer memory architecture including a replacement cache, discloses a test method that comprises,

- in response to a request from a second node to access the cache line, determining whether the state is an ambiguous state (e.g. see column 11, lines 4-5). As per definition of an ambiguous state given in the specification of this application, "an ambiguous state is a condition that identifies the last known state of the cache line at a member node that could have changed since last identified state". According to this

definition, when the last known state of the member node is shared

state and if the shared data is modified at some other shared node,

then the member node turns into ambiguous state; and

- resolving the ambiguous state, which comprises

    o snooping the first node for a current status of the cache line

       (e.g. see column 11, lines 4-5);

    o receiving modified contents of the cache line and updating

       memory location designated for storing a contents of the cache

       line (e.g. see column 11, lines 5-9).

Accordingly, It would have been obvious to one of ordinary skill in the art

at the time of the current invention was made to implement the method disclosed

by Anderson, by adding two steps, determining and resolving the ambiguous

state upon request to access the cache line, as taught by Witt. In doing so, every

modification made to the data on other/neighbor node will be broadcasted to

other nodes and the main memory and therefore, data coherency is guaranteed

and maintained throughout the system.

As per claim 9-14, see arguments with respect to the rejection of claims 1-

6.

As per claim 16, Anderson teaches a shared memory multiprocessor

system comprising a plurality of node controllers and a switch coupled to each of

the plurality of node controllers (e.g. see Figure1 and column 1, lines 14-48),

wherein the plurality of node controllers and the switch are programmed with

instructions causing the switch (by using the snoop filter) to

- maintain a state of a cache line last indicated by a first node controller
  of the plurality of node controllers (see arguments with respect to the
  rejection of claims 1-6);

- in response to a request from a second node to access the cache line,
  determine whether the state is an ambiguous state (see arguments
  with respect to the rejection of claims 1-6); and

- resolve the ambiguous state (see arguments with respect to the
  rejection of claims 1-6).

As per claim 17-18, see arguments with respect to the rejection of claims
16 and 1-6.

As per claim 19-24, the combination of Anderson and Witt disclose the
invention as claimed, detailed above with respect to claims 1-6; Anderson and
Witt however do not particularly disclose a computer-readable medium of
instructions to be implemented on a computer as being claimed in claims 1-6.
However, one of ordinary skill in the art would have recognized that computer
readable medium (i.e., floppy, cd-rom, etc.) carrying computer-executable
instructions for implementing a method, because it would facilitate the
transporting and installing of the method on other systems, is well-known in the
art. For example, a copy of the Microsoft Windows can be installed onto other
systems, which is a lot easier than running a long cable or hand tying the
software onto another system. The examiner takes Official Notice of this
teaching. Therefore, it would have been obvious to put Anderson and Witt's
program on a computer readable medium, because it would facilitate the

transporting, installing and implementing of Anderson and Witt's program on other systems.

Further limitation of residing the memory location on a third node is embedded in the prior art taught by Anderson, in view of Witt. In the multi-node shared memory system, the nodes are inter-connected/networked with each other so the memory location can be resided on either requesting node, responding node or any other node (the "third node"), by this rationale, claims 7 and 25 are rejected.

Claims 8, 15 and 26 are also embedded in the method taught by Anderson, in view of Witt because once the determination of the state whether it is in ambiguous state or not, and resolving the ambiguous state completes, the request of accessing the cache line completes.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
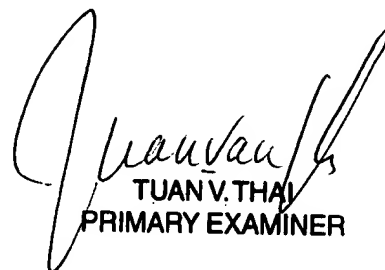
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hetul Patel whose telephone number is (703) 305-6219. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (703) 305-3821. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application

or proceeding should be directed to the receptionist whose telephone number is

(703) 305-3900.

HBP

TUAN V. THAI
PRIMARY EXAMINER